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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/565,003

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EXAMINER

GRAY, JILL M

ART UNIT

PAPER NUMBER

1794

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DELIVERY MODE

10/16/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,003	Applicant(s) KAMBARA ET AL.	
	Examiner Jill Gray	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Pursuant to the entry of the amendment of July 14, 2009, the status of the claims is as follows: Claims 1-11 and 13-18 are pending. Claim 12 has been cancelled. Claims 1-11 and 13-18 are under prosecution.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 1-6 and 8-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Komatsu et al., 4,816,289 (Komatsu), for reasons of record.

Komatsu discloses a vapor grown crimped carbon fiber having a multilayer structure comprising an inner layer part and an outer layer part with a hollow structure in the inside thereof, wherein the carbon layers are arranged substantially in parallel with the longitudinal axis of the filament and arranged substantially in the form of growth rings, further disclosing an embodiment wherein the carbon filament has such as small hollow portion in the center of the filament that the filaments are regarded as substantially solid filaments, as required by present claims 1-4 and 9. See entire document, and for example abstract and column 3, lines 63-68. In addition, Komatsu discloses that the crimped carbon fiber has a crimp percentage of 5 to 50%, which meets the present requirement of "0.5% or more" as set forth in present claim 5. See column 5, lines 46-54. The diameter of the fiber taught by Komatsu is in the range from 0.01 to 15 μm , (which corresponds to 10 nm to 15000 nm) and a fiber length of in the

Art Unit: 1794

range of from 20 μm to 20mm, as required by present claim 6. See column 6, lines 5-25. Regarding claim 8, Komatsu discloses that the carbon structure has carbon network layers (002) stacked at interlayer spacings (d002) of 0.345 or less and a Raman ratio (I_d/I_g) of 1 or more. See column 5, lines 20-45. This teaching meets the requirement of present claim 8.

Therefore the teachings of Komatsu anticipate the invention as claimed in present claims 1-6 and 8-9.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 7, 10-11, and 13-18 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Komatsu et al., 4,816,289 (Komatsu) as applied above to claims 1-6 and 8-9, for reasons of record.

Komatsu is as set forth above but does not specifically teach the surface area of the fibers as required by claim 7 or the specific sulfur atom vapor phase concentration in the heating zone as required by claim 11.

Regarding claim 7

Komatsu is as set forth above but does not specifically teach the surface area of the fibers as required by claim 7.

The teachings of Komatsu are drawn to a crimped carbon fiber that has substantially the same structure, crimp percentage, fiber outer diameter, fiber length, X-

Art Unit: 1794

ray diffraction, Raman spectrum and within the present claimed range, accordingly, the examiner has reason to believe that the specific surface area would be within the present claimed range as well, and thus would be inherent in the absence of factual evidence to the contrary. Applicants are invited to provide such evidence.

Regarding claim 10

Komatsu discloses that the crimped carbon fiber can be used with synthetic resin, adhesive, rubber or the like to form a prepreg or perform, wherein the fiber content is in the range of from 0.5 to 99.5% by weight. See column 12, lines 5-24. It is the examiner's position that this fiber content range is broad and would necessarily encompass the crimped carbon fiber being present in an amount of 5 vol%, and hence, this requirement of claim 10 is inherent in the teachings of Komatsu in the absence of factual evidence to the contrary. Applicants are invited to provide such evidence.

Regarding claims 11, 13-18

Komatsu is as set forth above but does not specifically teach the specific sulfur atom vapor phase concentration in the heating zone as required by claim 11.

Komatsu discloses a method for producing the crimped carbon fiber comprising contacting a carbon source and a catalyst source with a sulfur source in a heating zone to produce vapor grown carbon fiber, as required by present claim 11. See column 13, lines 48-66 and column 20, lines 13-58, and column 25, lines 25-32 and 63-66. As to the specific sulfur atom vapor phase concentration in the heating zone, it is the examiner's position that the since the vapor grown crimped carbon fibers of Komatsu are the same as or substantially similar to those crimped carbon fibers contemplated by

Art Unit: 1794

applicants, the examiner has reason to believe that this process requirement, i.e. the sulfur atom concentration would have been the same as or substantially similar to that set forth by applicants, in the absence of clear factual evidence to the contrary. The sulfur source can be sulfur or hydrogen sulfide as required by present claim 13. See column 25, lines 25-33. The carbon source taught by Komatsu is the same as the carbon source set forth by applicants in present claim 14, such as methane, ethane, or propane. See column 22, lines 25-30. As to claim 15, Komatsu discloses the addition of at least one compound of the type contemplated by applicant in said claim 15. See column 16, lines 43-63. Regarding claims 16-18, Komatsu discloses production methods whereby the heating zone temperatures and carbon fiber are further heated at temperatures within the present claimed ranges. See column 23, lines 48-50, and column 24, lines 9-50.

Therefore, the teachings of Komatsu anticipate or in the alternative, render obvious the invention as claimed in present claims 11, 13-14, and 16-18.

Response to Arguments

6. Applicant's arguments filed July 14, 2009 have been fully considered but they are not persuasive.

Applicants argue that the characteristic carbon structure of the present invention in claims 1 and 2 is not disclosed or suggested in Komatsu et al, further arguing that Komatsu et al disclose that the carbon layers are arranged substantially in parallel with the longitudinal axis of the filament, and are arranged substantially in the form of growth rings as viewed in cross-section of the filament, and that the direction of the carbon

Art Unit: 1794

structure is essentially different between that of the present invention, in which there is a herringbone structure or in which the carbon layers are vertical to the carbon fiber axis, and that of Komatsu et al, in which the carbon layers are arranged substantially in parallel with the longitudinal axis of the filament.

In this regard, Komastu teaches that his filaments have a carbon structure in which planar hexagonal layers are stacked upon heating. Note for example, column 5, lines 25-30. It is the examiner's position that VGCF fibers are grown concentrically or in the axial direction and upon routine processing conditions, such as heating, the hexagonal layers are stacked, forming a herringbone shaped structure, and also tilted with respect to the fiber axis. Therefore, the skilled artisan would have immediately envisaged a herringbone shaped structure or carbon layers vertical to the fiber axis based upon the teachings of Komastu that his planar hexagonal layers are stacked upon heating. Hence, the examiner has reason to believe that the teachings of Komastu anticipate the carbon fibers of present claims 1 and 2.

Applicants argue that with respect to the manufacturing process of claim 11, Komatsu et al disclose using a sulfur compound, but the specific amount of sulfur as stated in claim 11 is not used in Komatsu et al, further arguing that this difference of the amount of sulfur between the present invention and Komatsu et al is the reason why the present invention and Komatsu have different carbon structures and references Figures 16, 11 and 12 of Komatsu.

In this regard, as it relates to the amount of sulfur, it is the examiner's position that where the general conditions of a claim are disclosed in the prior art, it is not

Art Unit: 1794

inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 105 USPQ 233 (CCPA 1955). Moreover, as set forth above, it is the examiner's position that general processing conditions, such as temperature range, catalyst, flow-rate, etc. affect the carbon structure. Hence, the variance of the direction (vertical or parallel) or the planar hexagonal layers or stacked (herringbone shaped) would have been obvious to modify and adjust by the skilled artisan during routine experimentation commensurate on the desired properties of the end product, and for optimization purposes. Accordingly, this requirement is not construed to be a matter of invention in the absence of clear factual evidence to the contrary.

No claims are allowed.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yanagisawa et al., 6,969,503 B2 discloses VGCF fibers having herringbone shaped carbon structures.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1794

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jill Gray whose telephone number is 571-272-1524.

The examiner can normally be reached on M-Th and alternate Fridays 10:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jill Gray/
Primary Examiner
Art Unit 1794

jmg